

Subject: Introduction to Algorithms
Study year: 2026-2027
Study program: Computer Science
Exam period: 1
Place: Room A-204
Date: Thursday 14th January, 2027

Number of points: /16

EXAM

Writing time: 90min

Name and Surname:_____

Student ID:_____

Grade: _____

INSTRUCTIONS

1. The exam consists of 5 questions.
2. The use of a calculator is not allowed.
3. Write only what the question asks for.
4. You do not get minus points for wrong answers.

State the time complexity of binary search on a sorted array of n elements. (2 POINTS)

What is the worst-case time complexity of quicksort, and when does it occur? (3 POINTS)

Describe how a hash table resolves collisions using separate chaining, and state the average-case time complexity of a lookup. (5 POINTS)

Answer both parts about graph traversal: (0 POINTS)

i) Which traversal (BFS or DFS) finds the shortest path in an un-weighted graph? Why? (3 POINTS)

ii) Give the time complexity of both BFS and DFS on a graph with V vertices and E edges. (2 POINTS)

Circle the letter of the correct answer. (1 POINTS)

- a) $\mathcal{O}(\log n)$
- b) $\mathcal{O}(n)$
- c) $\mathcal{O}(n \log n)$